

**Preliminary Close Out Report  
Kerr-McGee Kress Creek/West Branch DuPage River  
West Chicago and Warrenville, DuPage County, Illinois**

**I. Introduction**

This Preliminary Close Out Report documents that the West Chicago Environmental Response Trust (WCERT) has completed construction activities at the Kerr-McGee Kress Creek/West Branch DuPage River (KC/WBDR) Site in accordance with *Close Out Procedures for National Priorities List Sites* (OSWER Directive 9320.2-22; May 2011). U.S. EPA has determined that the WCERT has performed all necessary and remedial action in accordance with approved remedial action plans, remedial design (RD) plans and specifications. A pre-final inspection was performed on October 18, 2012, and no further response is anticipated.

**II. Summary of Site Conditions**

Background

The KC/WBDR Site (CERCLIS #ILD980823991), also known as the Kress Creek Site, is located in DuPage County, Illinois, approximately 30 miles west of downtown Chicago, Illinois. The site stretches from southern unincorporated city of West Chicago, through Warrenville, to the northern edge of unincorporated Naperville, and consisted of approximately 6.7 miles of creek and river sediments, banks and floodplain soils contaminated with radioactive thorium residuals. Specifically, the site includes approximately 1.5 miles of Kress Creek stretching from a storm sewer outfall (located south of Illinois Route 38/Roosevelt Road and east of the Elgin, Joliet and Eastern railway) to the creek's confluence with the West Branch DuPage River, and approximately 5.2 miles down the West Branch DuPage River from the confluence downstream past the Warrenville Dam to the McDowell Grove Dam. The site and the surrounding area are shown in Figures 1 and 2 in Appendix B.

Investigations

The radioactive contamination at the KC/WBDR Site originated from a nearby facility known as the Rare Earths Facility (REF), which operated from 1932 until 1973. The REF is shown on Figure 2 in Appendix B. The REF produced non-radioactive elements known as rare earths and radioactive elements such as thorium, radium and uranium, for private entities and the United States government's use in federal atomic energy programs. The REF also manufactured gas lantern mantles. The REF extracted the elements from monazite sands, bastnasite (rare earth ore) and other ores using an acid leaching process, generating radioactive mill tailings as an unwanted byproduct. The mill tailings were stored in large piles at the REF. Kerr-McGee purchased the REF in 1967 and maintained operations at the facility until closing it in 1973. After passage of the Atomic Energy Act, the REF was licensed by the Nuclear Regulatory Commission (NRC). In November 1990, the NRC granted licensing authority to the Illinois

Department of Nuclear Safety, which is now known as the Illinois Emergency Management Agency/Division of Nuclear Safety (IEMA/DNS). The REF is undergoing cleanup and decommissioning under an IEMA/DNS license. Over the years, radioactively-contaminated surface runoff and discharges from the REF were conveyed by a storm sewer directly into Kress Creek. Materials containing thorium residuals then were distributed over time in the sediments of the creek and river and in some stream bank and floodplain areas.

The NRC conducted several studies from 1976 to 1978 to determine if any areas outside the boundaries of the REF had been contaminated by thorium residuals from the REF. The investigations, including an aerial radiological flyover survey and ground-level investigations, identified areas of thorium contamination in Kress Creek and portions of the West Branch DuPage River. NRC then conducted a more detailed study of the creek in 1981 and 1984 to gather more information on the extent and concentrations of the thorium materials. A second aerial radiological flyover survey of areas in and around West Chicago was performed in 1989 for the Illinois Department of Nuclear Safety. The flyover showed areas of elevated radioactivity in areas of the creek and river.

The KC/WBDR Site was placed on the National Priorities List (NPL) in February 1991, and U.S. EPA began a fund-lead remedial investigation/feasibility study (RI/FS) at the site in 1992, with the State of Illinois, including the Illinois EPA and the Illinois Department of Nuclear Safety, serving as the support agencies.

Both U.S. EPA and Kerr-McGee conducted investigation work at the site as part of the remedial investigation. As part of its fund-lead Remedial Investigation and Feasibility Study work, U.S. EPA conducted sampling at the site in 1993 and 1995. U.S. EPA's testing in 1993 included radiological walkover surveys of bank and floodplain areas along the creek and river, and sampling of soil, sediment, surface water and fish for radionuclides and other chemicals. U.S. EPA also conducted terrestrial and aquatic community surveys. Isotopic analysis of the radiological samples was conducted by U.S. EPA's National Air and Radiation Environmental Laboratory (NAREL) in Montgomery, Alabama. U.S. EPA's 1995 testing focused on the creek and included radiological walkover surveys of the sediment surface and radiological sampling of sediments. The 1995 samples were analyzed by the IEMA/DNS laboratory.

U.S. EPA's sampling was limited in scope and included only shallow soil and sediment samples, whereas Kerr-McGee's later extensive surface scan and downhole gamma data provide a much more thorough picture of the lateral and vertical extent of contamination at the site. U.S. EPA's data indicated that the highest radioactivity levels in sediment and soil were found in Kress Creek, with lower concentrations found in the West Branch DuPage River downstream of the confluence. The highest concentration of total radium was 843 pCi/g in the creek sediment and 673 pCi/g in creek floodplain soil; the highest concentration of total radium in river floodplain soil was 64 pCi/g, and none of the river sediment samples U.S. EPA collected exceeded the cleanup goal of 7.2 pCi/g.

At the time of the U.S. EPA investigation work, the site study area extended only as far south as the Warrenville Dam. Beginning in 1997 and continuing through 2003, Kerr-McGee conducted extensive, radiological characterization work at the site with IEMA oversight. Kerr-McGee's sampling strategy, developed as an outgrowth of its negotiations with the local communities, was to fully characterize the site and collect enough data to support detailed design efforts for site cleanup. Kerr-McGee's testing included radiological surface gamma scans of essentially 100% of the sediments, banks and affected floodplains.

If Kerr-McGee's gamma readings indicated materials exceeding 7.2 pCi/g combined radium (the cleanup standard used by U.S. EPA at both the Residential Areas Site and the Reed-Keppler Park Site), then Kerr-McGee conducted further delineation drilling and down-hole gamma logging at those elevated gamma locations to find the clean edges of contaminated areas. At each delineation-drilling location, gamma readings were collected from each 6-inch depth interval until a minimum depth of 36 inches (3 feet) below ground surface was reached. The drilling depth was extended, if necessary, to achieve a minimum of two consecutive readings below the 7.2 pCi/g criterion.

The extensive down-hole gamma logging data collected by Kerr-McGee provided information on both the vertical and areal extent of contamination. Between 1997 and 2003, Kerr-McGee's characterization efforts included nearly 14,000 borings at the KC/WBDR Site to characterize the extent of radioactive contamination. Kerr-McGee collected a limited number of soil and sediment samples for isotopic laboratory analysis, but the vast majority of the Kerr-McGee data consisted of field-collected gamma data. The area covered by this work included all site areas downstream to the Warrenville Dam and the wide, impounded area located upstream of the McDowell Grove Dam.

In 2003, Kerr-McGee officially took over most the RI/FS work and completed the RI and FS reports although U.S. EPA conducted the human health and ecological risk assessments. Summary statistics from Kerr-McGee's delineation drilling efforts are provided in the table below. The table shows the number of borings for Kress Creek and the West Branch DuPage River downstream of the confluence where a measurement greater than 7.2 pCi/g was obtained in the 0- to 6-inch depth interval and the number of borings where any depth interval had readings greater than 7.2 pCi/g. The average and maximum radioactivity levels for these locations are provided. As shown in the table, radioactivity generally decreased in the downstream direction.

| Reach   | Borings with<br>Measurement ><br>7.2 pCi/g | Average<br>(pCi/g) | Maximum<br>(pCi/g) |
|---|--|--------------------|--------------------|
| <b>0- To 6- Inch Depth Interval</b>               |  |                    |                    |
| Kress Creek                                       | 1,786                                      | 22.9               | 310                |
| West Branch DuPage River Downstream of Confluence | 1,182                                      | 16.9               | 213                |
| <b>All Depth Intervals</b>                        |  |                    |                    |
| Kress Creek                                       | 2,357                                      | 41.3               | 897                |
| West Branch DuPage River Downstream of Confluence | 3,317                                      | 26.5               | 402                |

For the 0- to 6-inch depth interval, the average radioactivity was 22.9 pCi/g in the creek and 16.9 pCi/g in the river. When the subset of data from the depositional area upstream of the McDowell Dam area (the furthest downstream portion of the river) was evaluated separately, only three 0- to 6-inch depth interval measurements exhibited total radium radioactivity greater than 7.2 pCi/g, with an average of 9.0 pCi/g. The maximum 0- to 6-inch depth interval radioactivity level was 310 pCi/g in the creek and 213 pCi/g in the river.

Considering radiological measurements from all depths, the maximum radioactivity occurred at the very upstream ends of the reaches, indicating that mixing with clean soils and/or sediments had occurred as the material was historically transported from the source area to downstream areas. The maximum radioactivity of 897 pCi/g was detected near the storm sewer outfall in the creek. In the river, the maximum level of 402 pCi/g was found at a location just downstream of the confluence with the creek. For comparison, the maximum radioactivity in the subset of data from the McDowell Dam area was 31 pCi/g, an order of magnitude lower than the maximum values in upstream areas of the creek and river.

#### Remedial Action

On March 24, 2005, a Record of Decision (ROD) was signed by U.S. EPA for the KC/WBDR Site. The ROD selected the following major components:

- Removal of approximately 75,000 cubic yards of targeted soils and sediments from the site using mechanical "dry excavation" techniques, with disposal of the targeted materials at a licensed off-site disposal facility. Prior to excavation, targeted areas will be isolated and dewatered to allow excavation in-the-dry. Targeted materials will be excavated to predetermined cut depths based on the available extensive characterization data. In order to remove the targeted materials, approximately 47,000 cubic yards of clean overburden materials also must be excavated and managed;
- Mitigation and restoration activities to restore aquatic and terrestrial areas of the site impacted by the cleanup activities to appropriate, stable conditions, including revegetation of appropriate areas and stabilization of streambanks; and

- Monitoring and maintenance of restored areas to assess the effectiveness of stabilization and revegetation measures.

Excavation and off-site disposal would take place for all thorium-contaminated sediments and bank soils above the 7.2 pCi/g cleanup level. Under the federal consent decree, Kerr-McGee agreed to design and carry out the cleanup at the site, with the cleanup estimated to cost \$71.9 million. The remedy achieves the following remedial action objectives (RAOs) for the site:

- Reduce risks to human health and the environment presented by sediments and floodplain soils containing elevated levels of total radium by reducing soil concentrations to levels that are consistent with the requirements outlined in 40 CFR Part 192 (the regulations implementing the Uranium Mill Tailings Radiation Control Act [UMTRCA]) and Illinois Source Material Milling Regulations; and
- Mitigate, to the extent practicable, potential adverse effects to the environment as a result of implementation of remedial activities at the site.

The design and cleanup was conducted under a phased approach, proceeding sequentially from upstream to downstream, with the site divided into several different sections or "reaches" as described below:

Reach 1: Kress Creek from storm sewer outfall to May Street  
 Reach 2: Kress Creek from May Street to Joy Road  
 Reach 3A: Kress Creek from Joy Road to Wilson Street  
 Reach 3B: Kress Creek from Wilson Street to Route 59  
 Reach 4: Kress Creek from Rte 59 to confluence with West Branch DuPage River  
 Reach 5C: West Branch DuPage River (WBDR) from confluence to Mack Road  
 Reach 5D: WBDR from Mack Road to River Oaks subdivision  
 Reach 5E: WBDR from River Oaks subdivision to Williams Road  
 Reach 6: WBDR from Williams Road to Butterfield Road  
 Reach 7: WBDR from Butterfield Road to Warrenville Dam  
 Reach 8A: WBDR from Warrenville Dam to north end of McDowell Grove  
 Reach 8B: WBDR from north end of McDowell Grove to the McDowell Dam

Reaches 5A and 5B are not associated with the KC/WBDR Site. They represent the river portion of the Kerr-McGee Sewage Treatment Plant Site.

Cleanup work at the site began in the summer of 2005. During 2005, Kerr-McGee completed cleanup work in Reaches 1 and 2 of Kress Creek, including cleanup in the residential neighborhood located closest to the source of the contamination and having the highest concentration of contamination at the site. During 2006, cleanup work was conducted in Reaches 3 and 4 of the creek, as well as in the river portion of the Kerr-McGee Sewage Treatment Plant Site (a related NPL site). In 2007, cleanup work was completed in Reaches 5C, 5D, and most of 5E. Work was completed in Reach 5E and all of Reach 6 in the summer of 2008.

Work was scheduled to resume in late April 2009 on Reach 7 of the river cleanup. In January 2009, however, Tronox (formerly Kerr-McGee) filed for Chapter 11 bankruptcy and ceased work on the site. U.S. EPA immediately began attempting to negotiate a settlement of environmental claims with Tronox that would fund the cleanup of Reaches 7 and 8 of the KC/WBDR Site. In May 2010, an interim agreement was reached with Tronox that provided funding to complete the Reach 7 cleanup in the summer of 2010. That work was completed in November 2010.

Subsequently, on February 14, 2011, a bankruptcy settlement agreement was reached with Tronox that provided for the creation of the West Chicago Environmental Response Trust, with Weston serving as Trustee. The trust was responsible for completing the cleanup of the KC/WBDR Site along with other remaining Tronox liabilities in West Chicago.

The cleanup of Reach 8A was initiated in July 2011 and was completed in early November 2011. The Bower Elementary School area in Reach 8A, Reach 8B and the Route 59 overpass over Kress Creek, the last of the KC/WBDR areas requiring cleanup, were all completed in the summer and fall of 2012.

The table below shows the volume of contaminated material removed from each of the Reaches in the KC/WBDR remedial action.

| Reach        | Volume (cu yds) |
|--------------|-----------------|
| Reach 1      | 10,182          |
| Reach 2      | 12,242          |
| Reach 3A     | 4,748           |
| Reach 3B     | 3,920           |
| Reach 4      | 4,044           |
| Reach 5C     | 14,155          |
| Reach 5D     | 3,079           |
| Reach 5E     | 5,881           |
| Reach 6      | 4,686           |
| Reach 7      | 43,662          |
| Reach 8A     | 8,574           |
| Reach 8B     | 13,896          |
| <b>Total</b> | <b>129,069</b>  |

As of October 8, 2012, all thorium-contaminated material above 7.2 pCi/g has been removed from the KC/WBDR Site.

#### Reuse of the KC/WBDR Site

Because the KC/WBDR Site was cleaned to Unlimited Use/Unrestricted Exposure (UU/UE) levels, institutional controls will not be required for the site. The West Branch

DuPage River is currently used by the public for recreational purposes, including fishing and canoeing, and it is expected that these uses will continue into the future.

### **III. Demonstration of Cleanup Activity QA/QC**

U.S. EPA and IEMA reviewed the regulator-approved project documents for compliance with quality assurance and quality control (QA/QC) protocols. Construction activities at the site were determined to be consistent with all remedial action plans. All excavation work was conducted in accordance with the relevant Common Scoping and Planning Documents and the relevant Final Design/Remedial Action Work Plans for the Reaches.

The U.S. EPA RPM and IEMA project managers have attended weekly on-site meetings during construction seasons since 2005 to review and oversee construction activities conducted in accordance with approved remedial action plans. Deviations or non-adherence to QA/QC protocols, drawings, or specifications were discussed at these meetings and were properly documented and resolved.

The site Common Scoping and Planning Documents incorporated all U.S. EPA and IEMA QA/QC procedures and protocols. U.S. EPA-approved analytical methods were used for all confirmation and monitoring samples during remedial action activities. U.S. EPA and IEMA have determined that the analytical results are accurate to the degree needed to assure satisfactory execution of all remedial actions.

### **IV. Activities and Schedule for Site Completion**

The following activities remain for the KC/WBDR Site:

| <b>Task</b>  | <b>Estimated Completion</b> | <b>Responsible Party</b>     |
|--|-----------------------------|------------------------------|
| Complete planting of trees and shrubs for restoration in Reach 8B                            | May 31, 2013                | WCERT                        |
| Complete post-construction inspection to initiate maintenance and monitoring of restoration. | June 30, 2013               | WCERT, U.S. EPA, IEMA, USFWS |
| Final RA Report  | September 30, 2013          | WCERT                        |
| Final Close Out Report   | September 30, 2016          | U.S. EPA                     |
| Final NPL Deletion   | 2016                        | U.S. EPA                     |


## V. Summary of Remediation Costs

The costs to remediate the KC/WBDR Site are shown in the table below. Ongoing monitoring and inspections are expected to cost approximately \$300,000 per year for at least three more years.

| Reach                               | Cost                 |
|-------------------------------------|----------------------|
| Reaches 1 and 2                     | \$20,192,071         |
| Reaches 3A, 3B and 4                | \$7,042,473          |
| Reaches 5C and 5D                   | \$17,325,523         |
| Reaches 5E and 6                    | \$25,327,278         |
| Reach 7                             | \$31,915,000         |
| Reach 8A                            | \$5,800,000          |
| Reach 8B, Bower School and Route 59 | \$20,100,000         |
| <b>Total</b>                        | <b>\$127,702,345</b> |

## VI. Five-Year Review

No hazardous substances remain at the site above levels that allow for unlimited use and unrestricted exposure after the completion of the remedial action. Therefore, no five-year reviews will be required for the KC/WBDR Site.

  
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Richard C. Karl, Director  
Superfund Division  
U.S. Environmental Protection Agency  
Region 5

11-6-12  
Date

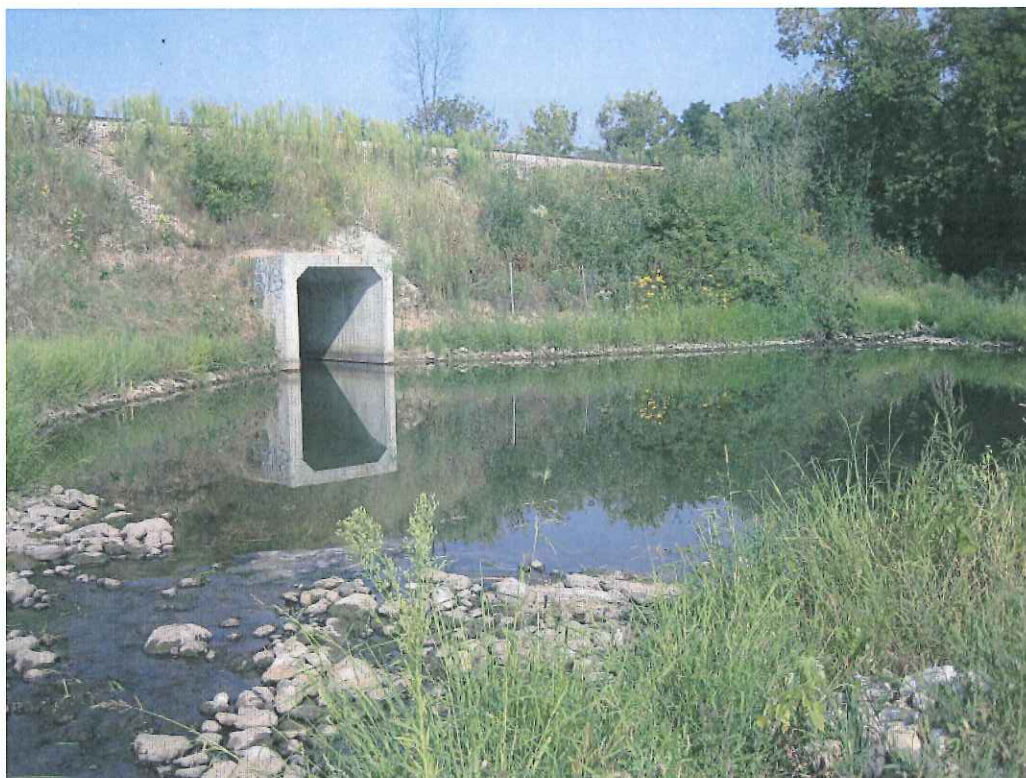


## References

1. Record of Decision for Kerr-McGee Kress Creek/West Branch DuPage River Site, DuPage County, Illinois, prepared by U.S. EPA, Final, March 2005.
2. Final Completion Report – Reaches 1 and 2, Kress Creek/West Branch DuPage River Site, prepared by Arcadis on behalf of Tronox, LLC, Final, August 2008.
3. Final Completion Report – Reaches 3A, 3B and 4, Kress Creek/West Branch DuPage River Site, prepared by Arcadis on behalf of Tronox, LLC, Final, August 2008.
4. Final Completion Report – Reaches 5C and 5D, Kress Creek/West Branch DuPage River Site, prepared by Arcadis on behalf of Tronox, LLC, Final, April 2009.
5. Final Completion Report – Reaches 5E and 6, Kress Creek/West Branch DuPage River Site, prepared by Arcadis on behalf of Tronox, LLC, Final, September 2010.
6. Final Completion Report – Reach 7, Kress Creek/West Branch DuPage River Site, prepared by Arcadis on behalf of Tronox, LLC, Final, February 2012.
7. Quality Control Reports for Reaches 8A and 8B, prepared by Arcadis on behalf of Tronox, LLC, April 2011 – October 2012.

# Appendix A

## Photos



Storm Sewer Discharge Outfall at Reach 1 – Source of Contamination from the REF



Reach 1 in 2008 – three years after cleanup





View of Reach 2 from the Joy Rd bridge looking north



View of Reach 3B west of Joliet Street



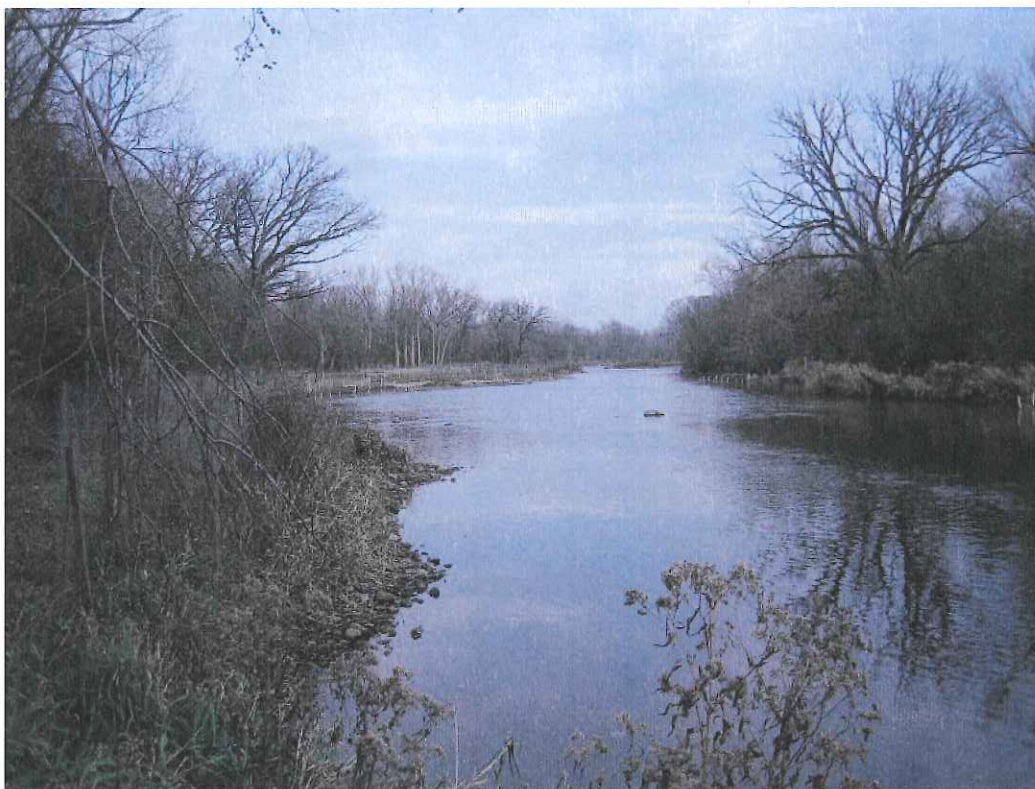


View of Reach 4 in 2006 during cleanup



View of same section of Reach 4 in 2011 after cleanup





View of Reach 5C in 2008



View of Restoration in Reach 5D in 2007





Construction of a mitigated wetland in Reach 5E



Excavation of contaminated sediments in Reach 6 in 2008





Reach 7 in project flood conditions in July 2010



Same view of Reach 7 during dry excavation in 2010 – The river is flowing through the pipes on the right of the photograph





Restoration of river bank behind Bower Elementary School after excavation of contaminated bank materials in Reach 8A in 2012



Completely Restored Reach 8B before last plantings – The entire middle section of the Reach was a “lake” before the cleanup. Now a creek enters the Reach to the top and left and the West Branch DuPage River flows below and to the right.

## Appendix B

### Maps of Kress Creek/West Branch DuPage River Site





